



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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August 14, 2001

TO: [REDACTED]

THRU: Wayne H. Western, Project Team Lead *WHW*

FROM: Priscilla W. Burton, Soils Reclamation Specialist

RE: *[Signature]* Midterm Amendment, Lodestar Energy Inc., Horizon Mine, [REDACTED] T99-4

SUMMARY:

The Division is required to review each active permit during its term, in accordance with R645-303-211. At the mid-point of the Horizon Mine permit term (April 1999), the Horizon Mining and Reclamation Plan (MRP) review was initiated.. The first Division Technical Analysis (TA) was dated April 23, 1999. The second TA was dated July 28, 2000. The third TA was dated March 13, 2001. This review is the Division's fourth look at the mid-term amendment to the Mining and Reclamation Plan.

Notable changes with this submittal are

1. An area of 4.04 acres will received topsoil and other final reclamation treatments.
2. The topsoil pile contains 2,458 cubic yards of soil.
3. Final topsoil depth will be approximately ten inches.

The following requests have been made in this submittal:

1. Provide an explanation in the narrative of the loss of over 8,000 cubic yards of topsoil from the topsoil pile.
2. Employ a qualified soil scientist at the time of final reclamation to evaluate the quality of the material which is to be excavated from the portals.
3. Provide a plan for removing coal mine waste from the drainage and flood plain in the vicinity of cross section F-F' as shown on Plate 3-7.
4. Provide in the plan a commitment to repair rills and gullies after final reclamation when such rills and gullies create a water pollution problem or create conditions that affect the establishment of vegetation or the post mining land use.

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TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200 (c); R645-301-220, -301-411

Minimum Regulatory Requirements:

Provide adequate soil survey information on those portions of the permit area to be affected by surface operations or facilities consisting of a map delineating different soils, soil identification, soil description, and present and potential productivity of existing soils.

Where selected overburden materials are proposed as a supplement or substitute for topsoil, provide results of the analysis, trials and tests required. Results of physical and chemical analyses of overburden and topsoil must be provided to demonstrate that the resulting soil medium is equal to or more suitable for sustaining revegetation than the available topsoil, provided that trials and tests are certified by an approved laboratory. These data may be obtained from any one or a combination of the following sources: U.S. Department of Agriculture Soil Conservation Service published data based on established soil series; U.S. Department of Agriculture Soil Conservation Service Technical Guides; State agricultural agency, university, Tennessee Valley Authority, Bureau of Land Management or U.S. Department of Agriculture Forest Service published data based on soil series properties and behavior; or, results of physical and chemical analyses, field site trials, or greenhouse tests of the topsoil and overburden materials (soil series) from the permit area. If the permittee demonstrates through soil survey or other data that the topsoil and unconsolidated material are insufficient and substitute materials will be used, only the substitute materials must be analyzed.

Analysis:

Soil resources are described in Chapter 8, Sections 8.1 through 8.3 and located on Plate 8-1 and Plate 8-2. The soil resource was surveyed in 1990 for the Blue Blaze Mine at the Order II scale by the Soil Conservation Service (Henry Sauer, personal communication with Leland Sasser USDA/SCS, 1991). Twelve pits were sampled and seven pits were surveyed for horizon identification, soil descriptions, and physical/chemical properties. Mapped soils were correlated with the following currently recognized soil series or complexes:

JIB	Brycan Loam-fine-loamy, mixed Cumulic Haploborolls
GIG	Curecanti Family - loamy - skeletal, mixed Typic Argiborolls
no symbol	Rabbitex Site Loam 15 to 50 percent slope-fine-loamy, mixed Typic Calciborolls
HIG	Senchert Loam-fine-loamy, mixed Argic Pachic Cryoborolls
FIA	Shupert-Winetti Complex-loamy-skeletal, mixed (calcareous), frigid Typic Ustifluent.

The soils within the proposed disturbance are primarily colluvium, alluvium, and residuum derived from sandstone, shale, limestone and siltstone. The majority of the disturbed area is within the Brycan Series (A horizon = 34 - 43 inches) and the Shupert-Winetti Complex (A horizon = 0 - 10 inches). The soils tend to be silty clay loam to loam within the Shupert-Winetti Complex and gravelly loam within the Brycan.

The soil capability classification ranges from III-e3 irrigated to VII-e non-irrigated. Under native vegetation, the water erosion hazard associated with these soils is slight to moderate. When disturbed, the erosion hazard is moderate. The soils are generally deep, well drained and moderately permeable. The pH of the surface horizon ranges from 7.2 to 8.0. The Electrical Conductivity (EC) ranges from 0.4 to 1.2 mmhos/cm. The depths of reported A horizon range from 0 for the Shupert-Winetti Complex to 43 inches for the Brycan Series. Soil profile depths generally ranged from 60 to 70 inches. Test pit 1 shown on Plate 8-1 had a high content of clay (43%) in the top 30 inches. Coarse rock fragment contents were also found during the Order II Survey, but the Division does not consider the rock content as a limiting factor for soil salvage and/or replacement.

During 1990, the excavation and analysis of refuse/coal waste material in pit #8 (location shown on Plate 8-1) revealed levels of Boron at 4.8 mg/kg (0 -12 inches) and 5.19 mg/kg (10 - 11 feet deep). Boron which exceeds 5 mg/kg is considered unsuitable growth medium and must be covered with a minimum of four feet of suitable growth medium. To verify the suspect Boron levels, three additional soil pits were excavated in the embankment area located southwest of the portals during 1996. None of the samples showed elevated levels of Boron.

The 1996 profile descriptions of the embankment southwest of the portals portray layered coal debris, coal waste, rock fragments and disturbed soils from previous mining operations. One pit sample showed an Acid/Base Potential (ABP) of -1.16 tons CaCO_3 /1000 tons material. This value approaches the Division's cutoff limit for ABP at -5 tons CaCO_3 /1000 tons. Overall, the concentration of coal in the spoil sampled makes the material undesirable for use in the surface fill. The coal and coal waste materials from the embankment will be used as backfill in the facilities area and covered with at least four feet of acceptable backfill material as described in Section 3.3.2.5.

An additional survey of Jewkes Creek soils was also conducted in 1996, when three soil pits were excavated in the lower facilities area (TP43 & 44 and 45). The first pit (TP43) was located in the bottom of Jewkes Creek channel while the second pit (TP44) was located on top of the west bank of the Jewkes Creek drainage. Although previously disturbed, sample results indicate that soils in both areas would be acceptable as substitute topsoil and/or backfill with the exception of the coal fines layer in the Jewkes Creek channel. The Jewkes Creek channel soils are unique since they have a fluvial origin which terminates at bedrock twelve feet below. The material consists mainly of sandy loam interbedded with coal fines ($\approx 30\%$) and loam, less than 10% rocks and no coarse fragments. A log of Test Pit 45 is found in Appendix 8-1 and located on Plate 8-1. The NRCS report of this pit indicates that the soils met the wetland criteria for hydric soil development in a small, narrow area, about 5 - 20 feet wide. The wetland area starts near where the small stream flows near the rock face and continues along the rock face and ends before the stream enters the culvert. The hydric soil was classified as coaly mixed (calcareous) frigid Aeric Fluvaquents.

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Findings:

The information provided meets the minimum environmental soil resource requirements of the Regulations.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230

Minimum Regulatory Requirements:

Topsoil removal and storage

All topsoil shall be removed as a separate layer from the area to be disturbed, and segregated. Where the topsoil is of insufficient quantity or of poor quality for sustaining vegetation, the selected overburden materials approved by the Division for use as a substitute or supplement to topsoil shall be removed as a separate layer from the area to be disturbed, and segregated. If topsoil is less than 6 inches thick, the operator may remove the topsoil and the unconsolidated materials immediately below the topsoil and treat the mixture as topsoil.

The Division may choose not to require the removal of topsoil for minor disturbances which occur at the site of small structures, such as power poles, signs, or fence lines; or, will not destroy the existing vegetation and will not cause erosion.

All materials shall be removed after the vegetative cover that would interfere with its salvage is cleared from the area to be disturbed, but before any drilling, blasting, mining, or other surface disturbance takes place.

Selected overburden materials may be substituted for, or used as a supplement to, topsoil if the operator demonstrates to the Division that the resulting soil medium is equal to, or more suitable for sustaining vegetation than, the existing topsoil, and the resulting soil medium is the best available in the permit area to support revegetation.

Materials removed shall be segregated and stockpiled when it is impractical to redistribute such materials promptly on regraded areas. Stockpiled materials shall: be selectively placed on a stable site within the permit area; be protected from contaminants and unnecessary compaction that would interfere with revegetation; be protected from wind and water erosion through prompt establishment and maintenance of an effective, quick growing vegetative cover or through other measures approved by the Division; and, not be moved until required for redistribution unless approved by the Division.

Where long-term surface disturbances will result from facilities such as support facilities and preparation plants and where stockpiling of materials would be detrimental to the quality or quantity of those materials, the Division may approve the temporary distribution of the soil materials so removed to an approved site within the permit area to enhance the current use of that site until needed for later reclamation, provided that: such action will not permanently diminish the capability of the topsoil of the host site; and, the material will be retained in a condition more suitable for redistribution than if stockpiled.

The Division may require that the B horizon, C horizon, or other underlying strata, or portions thereof, be removed and segregated, stockpiled, and redistributed as subsoil in accordance with the above requirements if it

finds that such subsoil layers are necessary to comply with the revegetation.

Analysis:

Removal

Soil plan for removal is given in Section 8.7 of the MRP. The island method of removal was used to salvage topsoil and substitute topsoil from locations identified on Figure 8-2, Growth Medium Removal Locations and the accompanying Table 8-3 Potential Topsoil/Growth Medium Available for Salvage. A target volume of 13, 670 cubic yards was set. That goal was superseded and approximately 15,000 cubic yards was salvaged and stored in the topsoil stockpile in November of 1996 (see the EarthFax Engineering Inc. report in Appendix 8-1 entitled "Horizon Mine Soil Salvage Practices, Fall, 1996, December 1996").

Plate 8-1, Soils, provides information on soil types for the mine site. Sections 8.3.1 and 8.3.2 provide a soil identification and descriptions. Table 8-3 presents the recommended depth of stripping and can be used for future reference. Although, Section 8.11 indicates that no additional surface disturbance involving soils will be required for the surface facilities.

Storage

Topsoil is stored in four locations for reclamation of the Horizon Mine. The following discussion of the volumes of topsoil available for reclamation of the 4.04 acres at the Horizon mine will be in order of the four storage locations:

1. The topsoil pile that was created in November of 1996;
2. In-place soils from areas 10 & 11 (beneath topsoil pile);
3. Areas D & E on Plate A, Appendix 8-1 hold 779 cubic yards of topsoil soil in a layer 20 inches deep (according to the January 2001 submittal section 3.5.2);
4. (As a last resort) the slopes of Areas A, B, and C which hold 975 cubic yards from the county road construction in a layer 11 inches deep (according to the existing MRP section 8.8.1) .

Topsoil Stockpile (2,458 cubic yards)

At its creation, the topsoil pile stored 10, 494 cubic yards (Appendix 8-1, Topsoil Stockpile Table). The topsoil stockpile was surveyed in May of 1997 and again in September/October of 1997. In 1998 replacement of a culvert beneath the pile resulted in the loss of over 8,000 cubic yards of topsoil material (as described in Section 8.8.1 of the MRP). Furthermore, the narrative on page 8-27 in Section 8.8.1 Resoiled Areas explains that,

" During mine construction in 1996/1997 and after the removal of topsoil/growth media, Mr. Brad Derrick, P.E. determined that the Portal Canyon pad area was 6 to 8 feet higher in elevation than the portal openings. As a result of this discovery, the pad area was regraded in 1997 and the materials were distributed to various locations within the disturbed area boundary. Contours on Plate A (Topsoil Growth Medium Distribution)

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within Appendix 8-1 reflect the pad regrading and placement of the soils."

This submittal confirms that loss with the information presented in Table 8-4 "1999 Topsoil Quantity Table (Pit Survey of Recovered Material)." The results of the soil survey conducted in November of 1999 suggest (by Division calculations) that 2,429 cubic yards of topsoil remain in the stockpile.

The volume of topsoil in the topsoil pile was also calculated using the difference between operating contours and proposed reclamation contours from Survcadd calculated volumes. Plate 3-7b Topsoil Storage Area shows the information generated. The calculated volume of topsoil is 2,458 cubic yards (which closely matches the Division calculations from the 1999 survey). The narrative states that this is a conservative estimate based upon a flat bottom, since no measurements were taken of the original stream channel. Cross-sections supporting Table 8-4 are provided as Plate 3-7b of this submittal. (Plate 3-7b is referred to in Appendix 8-1 Topsoil Stockpile Table, but not on Table 8-4 or in the narrative.)

Pre-mining contour maps were not used to develop an estimate of topsoil storage. Both Plate 3-6, Pre-Mining Topography, and Plate 3-2, PreMining and Operational Cross-Sections, were created in 1996 by EarthFax, Inc. These maps have been determined by Lodestar Energy, Inc. to be of little value, since the elevations reported do not match the ground conditions as surveyed in the year 2000, even for the undisturbed slopes of Portal Canyon. As a result, the topsoil stockpile elevation was higher than the portal elevation and so the difference between operational elevation and premining elevation was negative (no soil stored). In 1999, when Lodestar Energy, Inc. attempted to utilize the information on the maps and simply lower the elevations by a common amount, there were only a few points of correlation with the existing surveyed pad elevations. Lodestar Energy, Inc. prefers to utilize Plate 3-2, PreMining and Operational Cross-Sections, for its information about the shape of Portal Canyon prior to mining, rather than for precise elevation information.

In Place Soils (3,086 cubic yards)

The current MRP in Appendix 8-1, Topsoil Stockpile Table, indicates that 3,733 cubic yards of soil buried by the topsoil pile will be available for final reclamation. This submittal reduces that number down to 3,086.

Areas D & E (156 cubic yards)

The Division approved of the temporary distribution of topsoil materials to Areas D & E within the permit area to enhance the current use of those areas until needed for later reclamation. This layering of topsoil on the slopes was conducted under R645-301-234.300, under the conditions that such action would not permanently diminish the capability of the topsoil of the host site; and, that the material would be retained in a condition more suitable for redistribution than if stockpiled.

The current MRP in Appendix 8-1 Topsoil Stockpile indicates that Area D shown on Plate A of Appendix 8-1 received 499 cubic yards of topsoil.

The current MRP indicates Area E received 156 cubic yards of riparian soil and 124 cubic yards of other topsoil. For a total of 280 cubic yards.

This submittal indicates that only Area E will be redisturbed to supply 156 cubic yards of soil for reclamation. The remaining slopes will remain untouched during final grading.

Areas A, B, and C

Areas A, B, and C received 975 cubic yards of topsoil material during county road construction. The current MRP indicates that this material is available as needed upon reclamation. This submittal indicates that Areas A, B, and C will not be redisturbed during final reclamation, and topsoil from Areas A, B and C has not been included in the revised Appendix 8-1, Topsoil Stockpile Table.

Topsoil Storage Summary

In conclusion, Horizon mine has reduced its storage of topsoil available for mine site reclamation from 14,507 cubic yards down to 5,700 cubic yards. Consequently, the depth of coverage has also been reduced from twenty inches down to ten inches of cover. The area to receive topsoil cover has also been reduced from 5.49 to 4.04 acres due to the hillside west of the portals being labeled "contemporaneous reclamation." The figure of 4.04 acres has been noted in the revised Topsoil Stockpile Table in Appendix 8-1.

The drastic difference in volumes between the approved MRP and this submittal is most probably due to redistribution of soil from the topsoil pile into the backfill of the portals (personal communication on August 13, 2001, with Mr. Robert Davidson, former Division Soil Scientist). An explanation of this supposition would fit well into the narrative in Section 8.8.1 wherein the loss of soil due to the crushed culvert is described as is the regrading and redistribution of material to various locations within the disturbed area boundary.

To generate more material for topsoil cover at final reclamation, Horizon mine could utilize an additional 623 cubic yards from Areas D & E and 975 cubic yards from areas A, B, and C to bring the total to 7,298 cubic yards of topsoil material available at final reclamation. However, utilizing this material would provide only 2 more inches of cover depth (13 inches rather than 11 inches as specified in the submittal) over the total area of 4.04 acres. Imposing the original reclamation plan (for Areas A - E) upon the site will not generate enough material to make a difference in the final reclamation.

Rather, to generate more material for topsoil cover at final reclamation, the Division would prefer that a qualified soil scientist is employed at the time of reclamation to ascertain whether material excavated for concrete portal covers (as shown on Plate 3-7) is useful as topsoil. The Division requests that there is a commitment in the plan to employ a qualified soil scientist at the time of reclamation to determine where the best available soil material is for cover. This commitment is particularly important when one realizes the extent of effort that was made to gather all the best available material from within the disturbed area into the topsoil pile

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at the time of its creation. In other words, the material left in the pad is much less desirable than that which was removed, stored in the topsoil pile and subsequently lost.

Slopes in the disturbed area which have been dressed with topsoil and seeded in accordance with R645-301-234.300 (Plate A, Appendix 8-1 and Plate 3-7) have been designated as either "interim reclamation/topsoil storage areas" or "contemporaneous reclamation areas" on the Plate 3-7, Reclamation Topography. (Slopes which will not be redisturbed during final reclamation should receive a final seeding and planting according to the plan and should be designated as contemporaneous reclamation areas on Plate 3-7. Please refer to the analysis and deficiency written under section R645-301-353.100 for more detail.)

Interim reclamation/topsoil storage areas

On site, interim reclamation/topsoil storage areas will be designated with signs. As described in section 3.5.1, sediment control on these topsoiled slopes will consist of a mulch mat installed one foot above and below the cut bank.

Areas reported on Plate 3-7 as "topsoil storage on interim slopes" should also be shown on Plate 3-1, Surface Facilities.

Findings

Information provided in the proposed amendment is not considered adequate to meet minimum topsoil/subsoil operations requirements of the Regulations. Prior to approval, the permittee must provide the following in accordance with:

R645-301-231.400, Please state in the narrative of Chapter 8 or as a footnote to Table 8-4 that Plate 3-7b has the cross-sections which support the information in Table 8-4.

R645-301-234.300, For topsoil protection, topsoil storage areas should be labeled on Plate 3-1 Surface Facilities Map.

R645-301-231.400, R645-301-120 and R645-301-130, 234.200, A drastic difference in stockpile volumes has been presented in this submittal, please explain in the narrative (Section 8.8.1) that a loss of over 8,000 cubic yards of material occurred some time during culvert repair and portal construction in 1999.

R645-301-240, Place a commitment in the plan to employ a qualified soil scientist at the time of reclamation to sample and evaluate the soil excavated for concrete portal covers (as shown on Plate 3-7) and to determine where the best available soil material is for cover with the aim of increasing cover from an average of 10 inches to an average approaching 20 inches.

RECLAMATION PLAN

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-244, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Minimum Regulatory Requirements:

General

Disturbed areas shall be backfilled and graded to: achieve the approximate original contour; eliminate all highwalls, spoil piles, and depressions; achieve a postmining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long term static safety factor of 1.3 and to prevent slides; minimize erosion and water pollution both on and off the site; and, support the approved postmining land use.

The postmining slope may vary from the approximate original contour when approval is obtained from the Division for a variance from approximate original contour requirements, or when incomplete elimination of highwalls in previously mined areas is allowed under the regulatory requirements. Small depressions may be constructed if they are needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation.

If it is determined by the Division that disturbance of the existing spoil or underground development waste would increase environmental harm or adversely affect the health and safety of the public, the Division may allow the existing spoil or underground development waste pile to remain in place. Accordingly, regrading of settled and revegetated fills to achieve approximate original contour at the conclusion of underground mining activities shall not be required if: the settled and revegetated fills are composed of spoil or nonacid- or nontoxic-forming underground development waste; the spoil or underground development waste is not located so as to be detrimental to the environment, to the health and safety of the public, or to the approved postmining land use; stability of the spoil or underground development waste must be demonstrated through standard geotechnical analysis to be consistent with backfilling and grading requirements for material on the solid bench (1.3 static safety factor) or excess spoil requirements for material not placed on a solid bench (1.5 static safety factor); and, the surface of the spoil or underground development waste shall be vegetated in accordance with the revegetation standards for success, and surface runoff shall be controlled in accordance with the regulatory requirements for diversions.

Spoil shall be returned to the mined-out surface area. Spoil and waste materials shall be compacted where advisable to ensure stability or to prevent leaching of toxic materials. Spoil may be placed on the area outside the mined-out surface area in nonsteep slope areas to restore the approximate original contour by blending the spoil into the surrounding terrain if the following requirements are met: all vegetative and organic materials shall be removed from the area; the topsoil on the area shall be removed, segregated, stored, and redistributed in accordance with regulatory requirements; the spoil shall be backfilled and graded on the area in accordance with the general requirements for backfilling and grading.

Disposal of coal processing waste and underground development waste in the mined-out surface area shall be in accordance with the requirements for the disposal of spoil and waste materials except that a long-term static safety factor of 1.3 shall be achieved.

Exposed coal seams, acid- and toxic-forming materials, and combustible materials exposed, used, or produced during mining shall be adequately covered with nontoxic and noncombustible materials, or treated, to control the impact on surface and ground water, to prevent sustained combustion, and to minimize adverse effects on plant growth and the approved postmining land use.

Cut-and-fill terraces may be allowed by the Division where: needed to conserve soil moisture, ensure stability, and control erosion on final-graded slopes, if the terraces are compatible with the approved postmining land use; or, specialized grading, foundation conditions, or roads are required for the approved postmining land use,

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in which case the final grading may include a terrace of adequate width to ensure the safety, stability, and erosion control necessary to implement the postmining land-use plan.

Preparation of final-graded surfaces shall be conducted in a manner that minimizes erosion and provides a surface for replacement of topsoil that will minimize slippage.

Previously mined areas

Remining operations on previously mined areas that contain a preexisting highwall shall comply with all other reclamation requirements except as provided herein. The requirement that elimination of highwalls shall not apply to remining operations where the volume of all reasonably available spoil is demonstrated in writing to the Division to be insufficient to completely backfill the reaffected or enlarged highwall. The highwall shall be eliminated to the maximum extent technically practical in accordance with the following criteria:

- 1.) All spoil generated by the remining operation and any other reasonably available spoil shall be used to backfill the area. Reasonably available spoil in the immediate vicinity of the remining operation shall be included within the permit area.
- 2.) The backfill shall be graded to a slope which is compatible with the approved postmining land use and which provides adequate drainage and long-term stability.
- 3.) Any highwall remnant shall be stable and not pose a hazard to the public health and safety or to the environment. The operator shall demonstrate, to the satisfaction of the Division, that the highwall remnant is stable.
- 4.) Spoil placed on the outslope during previous mining operations shall not be disturbed if such disturbances will cause instability of the remaining spoil or otherwise increase the hazard to the public health and safety or to the environment.

Backfilling and grading on steep slopes

Underground mining activities on steep slopes shall be conducted so as to meet other applicable regulatory requirements and the requirements of this section. The following materials shall not be placed on the downslope: spoil; waste materials of any type; debris, including that from clearing and grubbing; abandoned or disabled equipment; land above the highwall shall not be disturbed unless the Division finds that this disturbance will facilitate compliance with the environmental protection standards and the disturbance is limited to that necessary to facilitate compliance; and, woody materials shall not be buried in the backfilled area unless the Division determines that the proposed method for placing woody material within the backfill will not deteriorate the stable condition of the backfilled area.

Special provisions for steep slope mining

No permit shall be issued for any operations covered by steep slope mining, unless the Division finds, in writing, that in addition to meeting all other regulatory requirements, the operation will be conducted in accordance with the requirements for backfilling and grading on steep slopes. Any application for a permit for surface coal mining and reclamation operations covered by steep slope mining shall contain sufficient information to establish that the operations will be conducted in accordance with the requirements for backfilling and grading on steep slopes.

This section applies to any person who conducts or intends to conduct steep slope surface coal mining and reclamation operations, except: where an operator proposes to conduct surface coal mining and reclamation operations on flat or gently rolling terrain, leaving a plain or predominantly flat area, but on which an occasional steep slope is encountered as the mining operation proceeds; where a person obtains a permit under the provisions for mountaintop removal mining; or, to the extent that a person obtains a permit incorporating a variance from approximate original contour restoration requirements.

Analysis:

General

Section 3.5.4, Backfilling and Grading Plans, indicates that reclaimed slopes will not exceed the angle of repose which for a slightly cohesive granular soil would be 35 degrees which corresponds to a slope 1.5h:1v or 70% slope. Section 3.5.8, Cost Estimate for Final Reclamation, indicates that cut/fill slopes will consist of sandstones and shales along with a minor proportion of clayey soils. The cut/fill slopes would have a Bulk Density of 1.15 lb/cu ft. and a Friction Angle of 37 degrees and a Soil Cohesion of 3.5 psi. The in-place material against which the cut/fill slope will rest will consist of sandstone and siltstones with a Rock Mass Bulk Density of 144 lb/cu ft and a Friction Angle of 45 degrees and a Soil Cohesion of 1000 psi.

Section 3.5.1 indicates that all fill will compacted to at least 85% of maximum Proctor density (ASTM D698). Compaction will be accomplished using repeated passes of rubber-tired equipment, rollers, and other appropriate equipment.

Coal Mine Waste

Section 3.3.2.5 of the existing MRP discusses the coal mine waste buried within the operations pad. The existing MRP indicates that approximately 2500 - 2700 CY of waste are buried 4 feet deep within the pad (page 3-49, Section 3.5.4 indicates that locations are shown on Plate A in Appendix 3-8). The plate in Appendix 3-8 is entitled Sweets Canyon, Pond Utilities. It did not have the information mentioned on coal mine waste burial locations.

In section 3.5.3.2 (page 3-44) it is mentioned that any toxic coal waste buried in the mine pad fill that is uncovered by reclamation grading work will be placed in the fill areas outside of drainages and covered with four feet of non-toxic fill. Locations will be mapped at the time of placement and submitted to the Division. As discussed above in this Technical Analysis under Environmental Soil Resource Information, previous sampling of this waste revealed some elevated boron levels. Refuse/coal waste material in pit #8 (location shown on Plate 8-1) revealed levels of Boron at 4.8 mg/kg (0 - 12 inches) and 5.19 mg/kg (10 - 11 feet deep). Boron is toxic to plants. Boron which exceeds 5 mg/kg is considered unsuitable growth medium and must be covered with a minimum of four feet of suitable growth medium. Additionally, the 1996 profile descriptions of the embankment southwest of the portals portray layered coal debris, coal waste, rock fragments and disturbed soils from previous mining operations. One pit sample showed an Acid/Base Potential (ABP) of -1.16 tons CaCO₃/1000 tons material. Therefore, the waste material buried on site is suspected as toxic for both boron content and acid generation.

Approximate burial locations of coal mine waste are indicated on Plate 3-7, Reclamation Topography. The map shows coal mine waste is buried very close to the proposed reclaimed channel of Portal Canyon. Of particular concern is the buried waste shown at cross-section F-F' on Plate 3-7, where measurements of the reclamation channel indicate that the channel will come in contact with the buried coal mine waste. The Permittee must ensure that runoff from the design storm will not come in contact with the coal mine waste, which means that the buried waste must be removed to accommodate the channel width (including topsoil coverage) and flood plain protection (see Figure 7-12, Typical Cross Sections For Reclaimed Channels).

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Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the permittee must provide the following in accordance with:

R645-301-536.300 Locate Plate A in Appendix 3-8 delineating coal mine waste locations as indicated in the MRP section 3.3.2.5 and in the submittal Section 3.5.4, page 3-49 or remove reference to this plate in these sections.

R645-301-536.300 and R645-301-731.311 and R645-301-746 Describe in the narrative and show on a map a plan for removing the coal mine waste from the stream channel and flood plain of Portal Canyon.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Minimum Regulatory Requirements:

Redistribution

Topsoil materials shall be redistributed in a manner that: achieves an approximately uniform, stable thickness consistent with the approved postmining land use, contours, and surface-water drainage systems; prevents excess compaction of the materials; and, protects the materials from wind and water erosion before and after seeding and planting.

Before redistribution of the material, the regarded land shall be treated if necessary to reduce potential slippage of the redistribution material and to promote root penetration. If no harm will be caused to the redistributed material and reestablished vegetation, such treatment may be conducted after such material is replaced.

The Division may choose not to require the redistribution of topsoil or topsoil substitutes on the approved postmining embankments of permanent impoundments or of roads if it determines that placement of topsoil or topsoil substitutes on such embankments is inconsistent with the requirement to use the best technology currently available to prevent sedimentation, and, such embankments will be otherwise stabilized.

Nutrients and soil amendments shall be applied to the initially redistributed material when necessary to establish the vegetative cover.

The Division may require that the B horizon, C horizon, or other underlying strata, or portions thereof, removed and segregated, stockpiled, be redistributed as subsoil in accordance with the requirements of the above if it finds that such subsoil layers are necessary to comply with the revegetation requirements.

Analysis:

Redistribution

The disturbed area is 9.15 acres. Table 3-1 shows the cut and fill estimates for the disturbed area. An average cut of 1.71 feet over 4.271 acres will yield 11,753 CY. An average fill depth of 1.46 feet over 4.34 acres will require 10,239 CY. The MRP indicates in section 8.8, that topsoil will be spread 10 inches deep over 4.04 acres. (Previously the figure was 5.49 acres, the difference is due to the plan to leave undisturbed areas identified as Contemporaneous Reclamation on Plate B.) Plate B, Appendix 8-1 illustrates the 4.04 acres of ground to receive the application of topsoil during reclamation.

The lower slopes in Areas B, D, and E (shown on Plate 3-7) will have topsoil removed from them during final reclamation. A qualified person will be on site to ensure that the topsoil stored on these slopes is removed and placed on the topsoil stockpile for reclamation use. Section 8-8 further identifies methods to be used when salvaging topsoil.

Findings:

The information provided meets the minimum reclamation topsoil and subsoil information requirements of the Regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Minimum Regulatory Requirements:

All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion. Rills and gullies which form in areas that have been regraded and topsoiled and which either disrupt the approved postmining land use or the reestablishment of the vegetative cover, or, cause or contribute to a violation of water quality standards for receiving streams, shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

Analysis:

Section 3.5.4, Backfilling and Grading Plans, indicates that reclaimed slopes will not exceed the angle of repose which for a slightly cohesive granular soil would be 35 degrees which corresponds to a slope 1.5h:1v or 70% slope.

As spelled out in Section 3.5.4 and Section 3.5.1, erosion and water pollution will be controlled by small depressions to retain moisture (refer to Plate 3-7 and Figure 3-6) and through silt fences at the bottom of fill slopes and along the top bank of the reclamation channel. Section 3.5.5.3 indicates that 2,000 pounds per acre mulch will be applied to the graded surface and incorporated into the surface with roughening before seeding. Erosion control matting will be used on all slopes that are 2.5h:1v or steeper.

Section 3.5.5.4 indicates that reclaimed and revegetated areas will be closely monitored, as described in Sections 3.5 and 9.8, for severe erosion, excessive weeds, bare patches and damage by wildlife. Section 3.5 did not indicate that the Permittee would stabilize and re-topsoil rills and gullies which form in the reclaimed landscape and which are disruptive to the

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postmining land use or which contribute to a violation of water quality standards..

Findings:

Information provided in the proposed amendment is not considered adequate to meet the requirements of this section. Prior to approval, the permittee must provide the following in accordance with:

R645-301-244.320 The plan must include a commitment as follows: rills and gullies which form in areas that have been regraded and topsoiled and which either disrupt the approved postmining land use or the reestablishment of the vegetative cover, or, cause or contribute to a violation of water quality standards for receiving streams, shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

RECOMMENDATION:

This submittal outlines a loss of over 8,000 cubic yards of topsoil from the topsoil during the year 1998. The loss is so drastic that an explanation is requested in the Mining and Reclamation Plan narrative. Furthermore, the employment of a qualified soil scientist upon final reclamation is requested to ensure that the best available material is utilized as cover and to create cover depths greater than ten inches. A commitment for the repair of rills and gullies is requested. The submittal is not yet recommended for approval.

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